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Mantis Study Group Newsletter 8

May 1998

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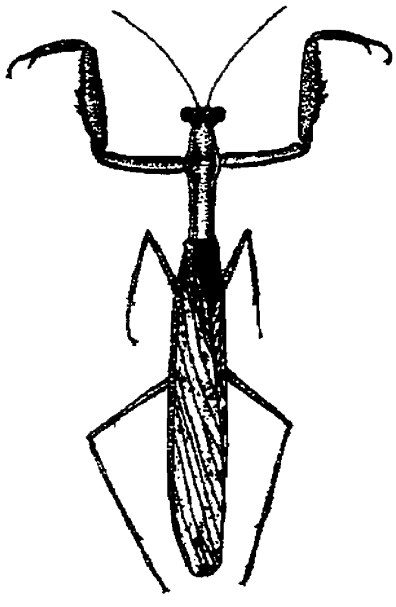


Editorial

The Group is now two years old, and still growing: membership is now in the region of 200. Recent newsletters have been thinner than we would have liked, the initial enthusiasm has waned and not enough people have been contributing.

I am pleased that someone has taken note of my pleas for material: Andy Lazebny has sent a large quantity of material. However, I am delaying some of Andy's material until the next newsletter in the hope that I can use some of the illustrations which he sent. I have not seen the illustrations yet since Andy sent them on disk and I have no way of accessing the format supplied. If people can send text on disk (in Wordperfect 5.1, or ASCII) it is much appreciated since it saves me having to type it all, but please make sure you send a hard copy of any illustrations!

I would like to remind everyone that the MSG annual meeting takes place on Sunday May 17th: details below.

Livestock coordinator

Steve Clark has now moved to Germany and Josephine Wheat has offered to take over as livestock coordinator. On behalf of all members, I would like to thank Steve for all his work finding mates for people's mantids, and for distributing nymphs of many species.

Josephine can be contacted at 25 Glovers Way, Bratton Farm, Telford, TF5 0PF. Tel: 01952-641764.

MSG Meeting: 17th May 1998

This is being held at the British Tarantula Society (BTS) Show on 17th May 1998 at Wood Green High School, Wednesbury, West Midlands. The venue is about two minutes from Junction 9 of the M6. The show opens at 1030, admission is £1.00 per person. The MSG meeting will be held in Classroom 2 and will start at 1515 with an illustrated talk on mantids by Phil Bragg, the talk will also be open all exhibition visitors. After the talk the MSG have exclusive use of the room until about 1645.

Forthcoming Exhibitions

The MSG should be represented at the following exhibitions. Anyone willing to help out on the stand should contact the appropriate member before the event.

17th May 1998 - British Tarantula Society Show, and MSG meeting (details on page 1).

11th July 1998 - West of England Creepy Crawly Show. Newton Abbot Racecourse. Paul Taylor is hoping to run a stand at this event, contact Paul for details.

12th July 1998 - Birmingham Reptile, Amphibian and Tarantula Show. Colmers Farm Leisure Centre, Northfield, Birmingham. From 1100 to 1700. Offers of help to: Josephine Wheat.

2nd August 1998 - Doncaster Reptile Fair. Adwick School. Tenterbalk Lane, Adwick-le-Street, Doncaster. Open 1030-1600. Offers of help to: Phil Bragg.

4th October 1998 - Amateur Entomologists' Society Exhibition. Kempton Park Racecourse. Offers of help to: Phil Bragg.

Advance notice of events (details to follow in a later newsletter).

22nd November 1998 - West of England Creepy Crawly Show. Newton Abbot Racecourse.

6th December 1998 - Midlands Entomological Fair. Kettering Leisure Village Arena.

Problems rearing *Orthodera novaezealandiae* — Phil Bragg.

Many people have reported problems with this species. Paul Taylor and I have both reared them successfully although we both had about a 50% death rate: this occurred in the 2nd/3rd instars. Other people seem to have had 100% dying, or close to this figure. No one seems to have any explanation for the difficulties, and Paul and I do not know why we managed to succeed!

More notes on the *Popa* in culture — Phil Bragg.

Bruno Meriguet forwarded the following abstract of a paper which was published three years ago.

Lombardo F. (1995) A review of the genus *Popa* Stål 1856 (Insecta Mantodea). *Tropical Zoology*, 8(2) 257-267.

It is suggested that *Mantis undata* Fabricius, 1793 does not belong to the genus *Popa* Stål 1856 as believed until now, but to the Indian genus *Ambivia* Stål, 1877 (n. comb.). The systematic position of the species of *Popa* is re-examined and a single species, *Popa spurca* Stål, 1856 (= *P. undata* auct. nec Fabricius) is recognised. The species is differentiated into two subspecies, one being *Popa spurca spurca* Stål, 1856 (= *P. stuhlmanni* Rehn 1914, *P. batesi* Saussure & Zehntner 1895) (n. syn.) widespread throughout all Africa south of the Sahara, except in the east which is populated by the other subspecies, *P. spurca crassa* (Giglio-Tos 1917).

In view of this paper, the correct name for the species in culture is *Popa spurca spurca* Stål.

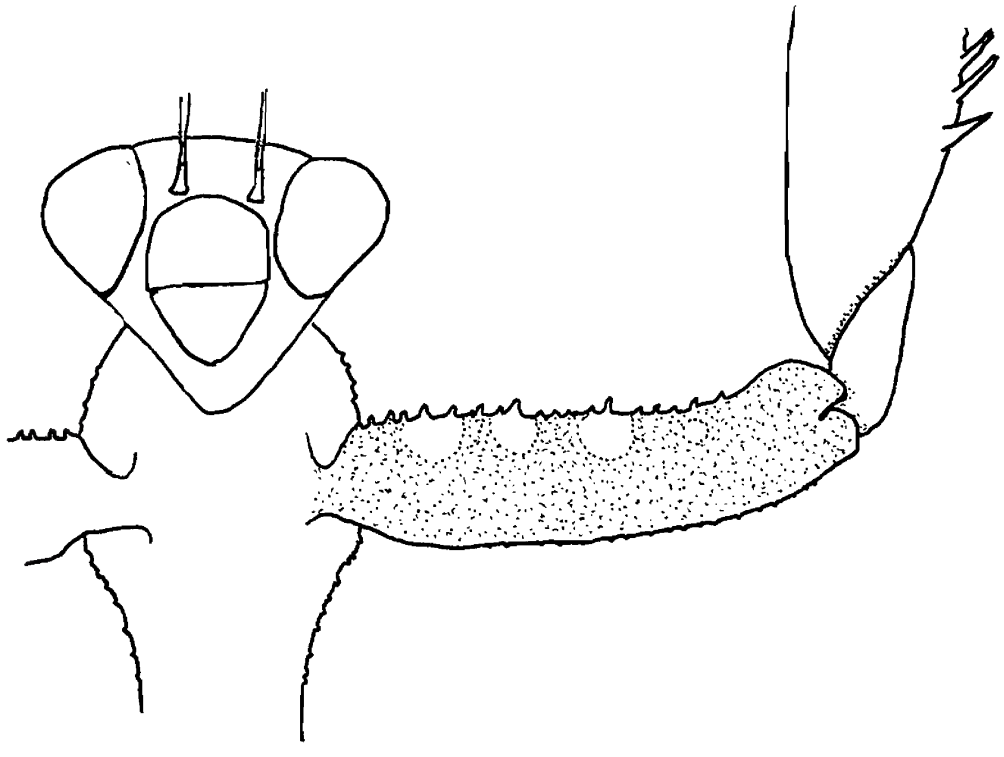
Vomiting problem — John Paterson.

I have a young mantis which I obtained a few months ago. It was feeding normally when, one day, it started to vomit. It continued to feed normally, but vomited after each meal.

Can someone please explain why?

Distinguishing *Sphodromantis lineola* and *S. viridis* — Phil Bragg.

These two species now appear to be well established in culture. *Sphodromantis lineola* is by far the most common species available in the UK, but *S. viridis* should soon become more widely available. Both species occur in both green and brown forms. The two are easily distinguished. *S. viridis* has large pale (usually white) spots on the inside of the fore coxae (see drawing below); *S. lineola* does not.



Myths from the internet

The following are edited versions of material which has recently appeared on a bulletin board on the internet. There was an initial note by Andrés Chávez followed by two replies.

From: Andrés Chávez (Email: abmantis@chih1.telmex.net.mx)

I live in Chihuahua, the largest state in Mexico, and it is recognized for its extreme conditions. My fascination for praying mantids began at the age of four: I still remember when my father caught a female and gave it to me to keep it. I was really intrigued. I watched how it cleaned its legs and how it ate a medium-sized cricket.

I am now 23 years old and doing an agricultural course at university. Two years ago I learned a lot of new things in an entomology class. For my final project I gave the teacher a very special collection of insects inside plastic capsules. For my thesis, I intend to raise Stagmomantis limbata (the well adapted mantid to those adverse and extreme conditions of my state) under laboratory conditions. I have about one hundred ootheca collected near the city! In my thesis I want to prove that this super-predator can be raised in laboratory. I want

them to lay ootheca and count how many from it will survive. Then I want to free them in some of the most important crops of Chihuahua and then evaluate its behaivour. This is the first time that the University wants to do something like that. But many people thinks I am crazy because there are some myths related to this insect. A lot of people believe:
Mantids are poisonous.
Mantids are lethal.
Mantids are horrible.
If a cow eats a mantid resting in the grass, it will explode, dripping blood and guts everywhere.

From: Joy Layton

Some interesting points have been raised by Andrés about the myths surrounding mantids. I grew up in Florida and raised many mantids as a hobby, but I never heard any of the myths until I was a graduate student at the University of Georgia. I'd take some of my mantids to local schools for fun educational programs and to my amazement most of the children had heard, and many believed, that mantids can spit poison! The poison is supposedly strong enough to blind a person. Of course it's completely untrue, and by handling the mantids and allowing the children to handle them, they got to see for themselves how fascinating and harmless (if handled gently!) mantids can be. I thought the poison-spitting mantids stories were just a Georgia myth, but I moved to University of Arkansas and encountered the same tale!

My guess is that some folks in the distant past may have handled some of the walking stick species which release an irritating fluid that can cause burning sensations in mammalian eyes and mouths, then those people passed on the story implicating any stick-like insect as the culprit of venomous behavior. At any rate, the myth of venom spitting mantids is widespread in the southern U.S.A. But I've found children to be so fascinated by seeing and handling the real thing, they can quickly overcome the superstition.

So, what can we mantid-lovers do to vindicate these wonderful insects? I've found that public school teachers welcome free guest lectures: just contact the principal and tell him/her you'd like to do a demonstration/lecture about insects. You'll be amazed at how many requests you'll get: over the last 5 years I've probably talked to 2000 children myself, and each time I've taken at least one mature female mantid that I've handled frequently so that I know she'll be pretty cooperative. I handle her while I talk (the children love it when the mantid climbs to the top of your head and stands there like she's conquered Mt. Everest) and afterwards I let children handle her emphasizing that as long as they don't pinch her or grab her she will be calm and cooperative.

My point is that small demonstrations to school children over a period of time will help to change attitudes. Children often enjoy becoming the teacher to their parents, siblings and neighbors once they've learned something new about things they can find right in their own yards. Also it would be interesting to hear from others about other mantid myths. What wild stories are told in other regions?

From: Michael Maxwell (E-mail: mmaxwell@mbl.edu)

The "poison" in mantids is the fluid that a handled mantid often regurgitates. Why this fluid is considered as poison is not exactly clear. The guess about the stick insects seems reasonable. It might also have to do with how the mantid is often viewed in a sinister light.

I've read in early papers by Blatchley that the mantid is called "mule-killer" in the South, supposedly because its venom can kill a mule. Can anyone vouch for whether this

term survives in the South?

The best scholarly work on this subject is: Prete, F.R. and Wolfe, M.M. (1992) Religious supplicant, seductive cannibal, or reflex machine? In search of the praying mantis. *Journal of the History of Biology*, 25: 91-136. This is a fascinating account of the history of views and studies of the mantis, from the ancient Egyptians to the present. In the paper, two somewhat distinct aspects of the mantis emerge:

* sage, scholar (ie. "praying" mantis: mantis is Greek for prophet, soothsayer) - Europe, Middle East.
* warrior - China, Japan.

The sage aspect sometimes takes on undertones of death or necromancy, as in ancient Egyptian and Sumerian writings.

My own observations point to a possible third category, demon. Indeed, the "mantids are poisonous" comments by Andrés and Joy suggest this as well. According to Blatchley (I believe), the mantis is also known as the "devil's rear-horse" in some parts of the U.S.A. I've been told that the mantis is called "mulo del diablo" in Costa Rica ("devil's mule"). While in Kenya, I learned that the mantis is called "yiimo" ("devil") in Kikamba, and its forelegs are called "upanga" (machetes). Interestingly, the Japanese word for mantis is "kamakiri", which means "sharp knife." The Japanese do not seem to regard the mantis as evil, but rather as a symbol of martial prowess.

A somewhat common notion that I've encountered in the U.S. is the belief that mantids are protected by law in some states (eg. California), and that killing one entails a fine. I and other researchers that I've talked to have not been able to find such a law.

Fabre, the famous French entomologist, also gives some mantis folklore: such as how an eggcase can cure a toothache.

Notes on Mantids in northeastern USA — Andy Lasebny.

Here in the northeastern U.S., when someone says "praying mantis", most people think of the large Chinese mantis, *Tenodera aridifolia sinensis*. This species is quite common and can be found almost anywhere during the right time of year. In New Jersey, the nymphs hatch in June, though the end of May is occasionally possible if there is an unusually warm spring. The earliest adults appear around the 10th or 12th of August, though usually it's a week later than that. That is when they start coming out, wandering about, and making themselves quite conspicuous. There has been a sort of a mystique surrounding this creature here in the U.S., especially during the middle of this century, well into the 1970s. Though it first appeared here about 100 years ago, I assume that it probably took several decades for it to spread out and become common enough to generate any interest. When they first started to become common, I heard about, or read, stories of people who had no idea what this strange creature was and that police stations would even get calls from people who did not know what this strange alien being looking back at them was. Usually the response was to tell the person what it was, and that it was not dangerous, and that it should not be harmed because it eats harmful insects. It became the only insect to ever get any respect. Though the usual reaction was always to kill any insect they saw, people tended to leave the mantis alone. Children were taught not to harm it or bother it, and a sort of "urban legend" grew around this insect. Rumours had spread throughout suburbia that there was a $50 fine for killing a mantis.

When I was a child, during the 1960s, my family moved from New York city to a northeastern New Jersey suburb, about 24km away. That summer (1966), we saw our first

mantids, and I remember being frightened, but curious about them. My parents did not know what they were, but very soon neighbours began to tell us how you are not supposed to kill them because they eat harmful insects. It was very obvious to all the children around that this creature was not to be disturbed, and most kids left it alone. People everywhere would talk of the supposed fine whenever a mantis was mentioned. The mantis was sometimes mentioned in the news, would appear in animal and nature programs, and would even occasionally appear in a newspaper story. By the middle of the 1980s however, I noticed a change in that the mantis seemed to sort of fall out of favour in our popular culture, as if the new generation no longer found it interesting enough to even mention. Nature programs were the only place where any reference at all was made to mantids. But during my childhood, I found the mantis very interesting, and as soon as I learned to read and received a library card, I read all I could find about this insect. There were several books, a few almost exclusively about mantids. One was about keeping them as pets, with the author's captives shown in black-and-white close-up photos throughout the book. I kept my first one, a brown female, when I was 6, in 1968. I remember how tame she was and I would take her out of the jar each day and feed her Mexican bean beetles, which were pests found on our garden bean plants, and grasshoppers. I released it back into the garden once school started. At that time, mantids were more common than they are today, and I once counted more than 15 egg cases during the winter in our small 15m by 30m lot. Now it's hard to find more than one or two. I suppose the clearing of vegetation, more development, and spraying of insecticides took their toll.

Each year I would keep a few mantids for a few days or weeks, feeding them all kinds of insects, then releasing them back into the garden. There were enough of them in the garden that I would often just feed them as they sat on a bush, since they usually stayed on the same bush for days or weeks at a time. In October of each year I brought one or two of them into the basement, to see how long they would live if kept out of the cold. Early December was the longest that I could manage then. This was in the early 1970s, and I didn't have access to store-bought crickets then, so finding food for them that late in the autumn was often difficult.

I kept these mantids in home made cages made out of a cardboard box with an opening cut out of one side and a screen stapled to it. Later I built a large screen wood cage with a sliding door, and also used home made glass tanks glued together with aquarium sealer. I tried various size cages, and small ones worked best when it came to feeding the mantis, since the prey items had less room to escape and were more likely to crawl directly in front of the mantis.

At some point during the 1970s, I noticed that some of the mantids I saw were noticeably smaller and thinner, with different shades of green and brown then normally seen. The males especially would be thin and small. At first I thought they were just some that did not grow too well. They were definitely not European mantids, (which is what *Mantis religiosa* is called in the U.S.), since I was somewhat familiar with this still smaller and far less common species. Finally, a few years later, I read a book that briefly mentioned the existence of another imported mantis species - the narrow-winged, *Tenodera angustipennis*. Though there was no picture or description, I assumed (correctly) that those slightly smaller ones were narrow winged. One year I tried to finally figure out the difference, and discovered, through observation, many things that I still have never found in any book. By examining dozens of adult live specimens of mantids throughout the area I lived in and the school grounds, I figured out the differences between the two species. The Chinese and narrow winged mantids were quite commonly seen on the school grounds and neighbouring

buildings walls and shrubs. The storefronts of the downtown shopping areas sometimes would have an occasional mantis on them; they probably flew there at night to catch insects attracted to the lights. In the town I lived in, most gardens had them, and the weedy areas near the river two blocks from the house were filled with both species. (I rarely saw European mantids, however: the entire time I lived in this area I only saw about 5 or 6).

The way to tell the two species apart is as follows: The *Tenodera aridifolia sinensis* hind wings are dark reddish-brown, almost opaque. The hind wings of *Tenodera angustipennis* are a very pale reddish-brown, almost clear. The hind wings are also proportionally narrower. *Tenodera aridifolia sinensis* has a yellow spot on the underside of the prothorax between the forelegs; the narrow winged has an orange spot there. Also, as the adults get older, the top of the abdomen becomes shiny dark brown in *Tenodera aridifolia sinensis*, shiny dark gray in *Tenodera angustipennis*. The shades of brown and green are also different. Though both species come in quite a few variations and mixtures of greens and browns, the green on a *Tenodera aridifolia sinensis* is usually brighter and more vibrant, while the other species has a bit more of an olive tone. The brown phases of *Tenodera aridifolia sinensis* are rich dark or tan, the other one a bit duller and greyer. The egg cases are also very different - round in *T. aridifolia sinensis*, narrow and elongated in the *T. angustipennis*. *T. angustipennis* is also about 75% the size of *T. aridifolia sinensis* on the average, about 8cm long instead of the 9cm or 10cm of the larger one. *T. angustipennis* was never as common in the area I lived in as *T. aridifolia sinensis*, but there was a very large isolated population in a patch of lythrum flowers along the edge of the river. In this approximate 200m^2 area, I was able to go each day in September and find between two and four narrow-winged adults each day for almost the whole month!

I sometimes had captive specimens mate so I could be guaranteed extra egg cases for the next year, and those would be put out in the garden. I never tried hatching them early, since there was no food available that I knew about at that time. I seldom bothered with the nymphs. I waited for the adults to appear each year. By age 12 or so I kept my last few mantids, and lost interest for a while. Since I could not find anyone else out there who shared this interest, I got bored and became interested in other things. When summer came I would still occasionally keep an eye out for them, and observe them, but that was as far as I went. When I went to high school I did notice that a row of evergreen shrubs along one wall of the building always had at least a few mantids on it in the autumn. Also, when I went to college in 1980, in Newark, New Jersey (N.J.), a very urban place, I did see all three species of mantids on campus shrubs at one time or another, though I did not pay much attention to them. Throughout the 1980s and early 1990s, I paid very little attention the these creatures, but I did notice a drastic decline in their general population everywhere. I would only see two or three per year. Though I was not looking for them then, I still should have accidentally come across many more. I do not know the reason for the population decline.

In 1992, I bought a house in central N.J. on a 30m x 50m lot, and got married. My wife and I began a garden in the 300m^2 back yard. I dug out almost the whole dull lawn and planted a wild-flower and perennial garden, leaving only a winding grass path. I planted flowers to attract butterflies. Someone gave me an organic garden catalog which had Chinese mantis egg cases for sale. I decided to order three and I placed them in the garden. They hatched in mid June of 1993, and my interest in mantids was renewed after almost 20 years of not bothering. I helped them along, observed all kinds of interesting behaviour and activities, and made a lot of new discoveries, things I missed or did not notice when I was a child. In mid October I decided to take in two brown females, right before the first frost. Now that I could just buy crickets at a pet store, it was easy to feed them. I put them in a

glass 36 litre aquarium with a divider and lots of twigs and branches. I fed each a cricket in the morning, and one at night. Each mantis made an egg case every three weeks. One lived up to 14th January 1994, the other until 25th February 1994. This was far longer than I ever imagined, and every year since then I have taken in a few and could not even get close to that kind of longevity. They all died between the middle and end of December. I also changed jobs in 1991, and in that town I noticed something I never saw anywhere else - a large population of European mantids. In downtown Somerville, N.J., where I still work, starting in early August of each year, the *Mantis religiosa* become adults. They can be seen on the storefronts and the walls of the post office. I would see at least three or four different ones per week, including some on the entrance to the office building where I work. There are also *Tenodera aridifolia sinensis* in the same town, but they are mostly found in this long, narrow, well landscaped area that occurs between two five story buildings. There the town plants shrubs and perennials, and a huge trellis with a dense flowering vine also exists. This blooms with tiny white flowers in the late summer till frost. On this vine, about 10 feet in the air, can be found quite a few *Tenodera aridifolia sinensis*. (The egg cases they make are visible in winter). There is also an old abandoned house with an overgrown yard in which I see this species every year when I take my daily lunchtime walk. I found about a dozen in there in 1996. In August 1995, I moved to my present location, and before moving I took all the mantids I could find in the garden of the house I was selling, (about 15 total) and released them in my father's yard where I grew up.

As to where other populations may exist: I found another location where there are *Tenodera angustipennis*. I had not seen one of those since around 1980, but in October 1996 I went to Cape May, on the very southern tip of N.J., and saw that the entire town was populated with *Tenodera aridifolia sinensis*. I also went to the Cape May migratory bird refuge, which is maintained by the Nature Conservancy. This not only a well known stop for rare shore birds, but an intermediate stop for migrating monarch butterflies. In October, there were thousands of them flying along the shore and the goldenrod fields. I took an hour long walk along a trail through the marsh and woods, and found two green female *Tenodera angustipennis*. There were none of the others anywhere to be found, except in town.

Mantis religiosa also exist along a highway a few kilometres from where I live now; I found two males on some evergreen shrubs planted in front of a pet store. That is about all I could find of that species until this year.

Mantispotting - or the Praying Mantis Season 1997 in New Jersey, USA.

— Andy Lasebny.

[Editor's note: The following is the first part of a diary of mantis events made by Andy Lasebny in 1997 (the rest will be appear in a later issue of the MSG Newsletter). It was recorded as the events happened, and is presented here with only very minor editorial changes: mainly conversions to metric units and English spellings.]

Part 1. - July to September.

Mantis spotting is much more interesting than trainspotting, plus you can take it home with you. The following deals largely with urban mantids. It includes comments, observations, questions, and immediate reactions about both wild and captive mantids. Also included are the location, time of day and weather conditions when a mantis was found, if it seemed worth noting.

The purpose of the document is to give group members that live in areas other than the

northeastern US, and those that live in places that do not have naturally occurring mantids, an idea of what "praying mantis season" (what I call the time the first adults appear in the wild until the end of their lifespans) in this part of the world is like. I would really like every member who lives in an area of the US other than the northeast and those in other parts of the world to do a similar documentation. This would give group members a good idea of what species of mantis are available in that area, where they can be commonly found, and most important, exactly what time of year the major mantis activity takes place in that area. I have gone on vacation to many parts of the southern and western US and with a few exceptions, have seen almost no mantids. Did I go at the wrong time of year? Did the major activity period pass already or has it not yet occurred? Did I look in the wrong place? Is there more than one generation per year anywhere outside of tropical countries? There seems to be no information of this kind available anywhere. All I know is that according to the book I have, "How to Know the Grasshoppers, Crickets, and Their allies", there are more than two dozen species of native mantids in the southern and western US, none of which I ever saw, with the exception of the one I found this year in Florida. The US is instead overrun with *Tenodera aridifolia sinensis*, (known here as the Chinese praying mantis), which can be found almost anywhere. New Jersey has three introduced species, including the above.

The other species are *Mantis religiosa*, (known here as the European praying mantis), and *Tenodera angustipennis,* (known here as the narrow-winged praying mantis).
I made very little effort to go to natural areas to look for mantids; these are mantids as they occur here in context of ordinary day-to-day activities. I proceeded with doing all the same things on a typical day as I normally would, except that I kept my eyes open for possible mantis sightings as I went to work, shopping, or took part in leisure activities. I am using the scientific names throughout, since common names may vary.

July 29, 1997 - Well, here it is the end of July and I've just seen the first adult *Mantis religiosa* of the season in what appears to be its natural habitat - the concrete parking deck and surrounding buildings where I work. It's strange how I almost never see this species on any of the vegetation. Most are found on the building, or even in the middle of the parking lot on the ground, where they sometimes are run over by cars. This attractive, bright green female was perched in the usual head down position a few centimetres above the ground on one of the concrete columns, about 12m from the nearest vegetation, and that vegetation is not the kind one would normally find mantids in, since it is not dense enough. It must have just moulted a day or two before, since it still is soft and delicate to the touch. In the six years I've worked here, I've only seen one *M. religiosa* nymph. All other times the adults just appear suddenly, and I do not know from where. The *Tenodera aridifolia sinensis* in the area will be full grown in about three weeks- I saw a few nymphs on some shrubbery around town. At least with these I know where they are coming from, and see their egg cases during the winter. I have yet to find an egg case of *M. religiosa*. I will keep this new mantis and should be able to find a mate for her soon, probably on the side of some building as well.

On June 7th of this year, I received four newly hatched *Tenodera aridifolia sinensis* nymphs. Though two did not survive, (one lost because of cannibalism, another due to a bad moult), the two remaining are in great shape and have only one more moult to go before they reach adulthood. All this in such a short time - about two weeks ahead of those outdoors. Though both of these were green, after the last moult one of them turned brown. There it goes again, that same thing I have observed time and time again in this species. A nymph

that is green may or may not stay green, but one that is brown will always stay brown. Though I cannot tell their sex yet for sure, it appears that I may have one of each, since the green one is larger and broader than the brown one.

This year, we had a cooler than normal spring, and even in early June it was cooler than expected. Then the 100 degree fahrenheit heatwave hit, with no rain at all for weeks. Even with these seemingly less than favourable conditions, the *Mantis religiosa* in the area are adults quite early this year. I wonder when they hatched and how long it takes them to become adults. Maybe the hot weather accelerated their growth after a slow start, I do not know. The other species seems a bit smaller than they should be at this time of year, but by only one moult. These adults may arrive a bit later this year.

August 4th - I went for a walk around the town I work in on this sunny morning, looking for a mate for *M. religiosa*. After about five minutes, I spotted a small mantis on a store window. After a closer look, it turns out to be a *Tenodera aridifolia sinensis* nymph. Oh well, wrong species. I picked up the little mantis and placed it on a nearby potted plant. During lunch I take another walk, and it's still there.

August 6th - another nice morning, and another walk yielded nothing, but that little nymph is still on that plant. Maybe I will take it home if I see it again later. At lunchtime, there it was, but now on the glass, a few centimetres near the door. So I took it before someone knocks it off and steps on it. Back home, it's eating fairly well and will hopefully moult soon.

August 9th - early in the morning, I go to check on the two caged mantids, and the larger of the two has just moulted - just as I thought, a female. Her wings were still drying, not well folded yet. Later that day, the other one moulted, and I guessed right again - a male. The following morning, I notice the formerly green female is now all brown! Right after she moulted, she was all green, but as she darkens she is getting more and more brown. I still do not see the pattern here.

Sunday August 10th - Unfortunately, I have to go to work this weekend, so I'm leaving. I get to downtown Somerville on this warm sunny morning, walk from the parking deck to the front door of the building, and there it is on the brick wall - a brown female *Mantis religiosa*. I immediately take her, put her in a box, and put her in my car. Still no males though. I take the new mantis home and feed her. She is very hungry and quickly gobbles up a cricket.

August 11th - It's now Monday morning and I'm back at work. I go for my lunchtime walk, and it is very hot and humid. I take a look on the building again, and not more than 7m away from the one I found yesterday - another brown female *Mantis religiosa* on the brick wall. Might as well keep this one too. I take her home and feed her. I'm running out of separate containers, and will have to build some cages.

Tuesday August 12th - I had to drop my car off at a mechanic for some minor repairs, about a ten minute walk from the office. As I walk along on this cloudy but very warm morning, I am looking around for more mantids. On both sides are uninterrupted rows of stores, and I look on the walls and windows. About a hundred metres from the office, I see it immediately - on the large window of a store there is a green female *Mantis religiosa*. Oh well, that makes four, but still no males. I put her in a bag and take her in. As I'm leaving that evening and walking through the parking deck, I notice that another mantis had been run over by a car. Sometimes they tend to walk on the ground for some reason, and that can be dangerous.

Wednesday August 13th - Its cloudy with on and off rain, very humid. I go for a

lunchtime walk, and towards the end of the walk I spot a green male (finally) *M. religiosa* on the huge blank concrete block wall of the supermarket located adjacent to the parking deck of the office. I take this one and put it in the car. On the way home I stop into a pet store about ten minutes from home to buy crickets. On the way out I take a quick look on the small row of Japanese yew hedges in front of the store and spot two *Mantis religiosa* - an almost grown nymph and a tiny adult male. The nymph appears to be a female, so I leave that alone, and take the male. I've seen mantids on that same shrub last year, so it's not surprising that there are some there again.

August 14th - During my walk in town during lunch, I see two green *Tenodera aridifolia sinensis* nymphs on some shrubs around an old house. I leave these alone.

The week of August 18 - a week vacation. On Thursday I went to the southern tip of New Jersey, Cape May. I saw two *T. sinensis* nymphs in the town. Next day, I went to the migratory bird refuge in search of some *Tenodera angustipennis*, which I saw there last year, after not seeing this species for more than 15 years. After an hour walk, I saw four *Tenodera aridifolia sinensis* nymphs instead. These are late in becoming adults this year. All seem to be in the same state - one more moult to go. Also spotted along the trail, numerous monarch butterflies, spicebush swallowtails, buckeyes, a toad, a gray treefrog, a lot of dragonflies, several katydids, and some very camouflaged light beige and white grasshoppers that live on the sand along the beach, and practically disappear when they land on the white sand.

Saturday, August 23rd - I saw two *T. sinensis* nymphs on shrubs at a house near the bay, about 20 miles south of where I live, one green, one brown.

Monday, August 25th - At about 2000 I was driving out of a parking lot about ten minutes from my town. I glanced to the right, and on a dark green evergreen shrub I could see a large bright green mantis, about 5-7m from the car. I pull the car to the side and get out for a better look. It's an adult (finally) female *Tenodera aridifolia sinensis*. Looks very nice, so I take her home. Now I have ten altogether. I should have them mate as soon as possible. The nymph I found on the store window on August 6th has moulted about a week ago and has one more moult to go. Looks like a male, so this one can be used for mating purposes. It has slowly turned brown, like the other nymphs did.

August 26th - I saw two mantids at a flower farm, a 15 minute drive from the office. One was a large brown adult male and the other a green nymph, almost ready to moult. Same species as above; I left them alone in their lush garden. The adults are finally beginning to emerge across New Jersey.

Back home, all the *Mantis religiosa* are doing well. The females are quite aggressive and do chase after crickets put into their cages. The males eat far smaller crickets and not as many. It's really time to have these mate. The two original *Tenodera aridifolia sinensis* that I raised to adulthood from hatchlings are not doing as well as they should. The big female is not as aggressive as most are, and eats less than she should, and less than she did the first week after the last moult. She only accepts small crickets, takes a long time to strike, after staring at it for a very long time. Sometimes she grabs the cricket and drops it only after a bite or two. I can't figure out what is going on. The male also takes too long to finally strike at a cricket, and does not eat as much as he should. They both ate normally when they were nymphs and during the first week they were adults. The female readily accepted full grown crickets. Now she will not take anything over a certain size, and only eats one small cricket each day, but some days not at all. This size mantis, 10cm long, should be eating several full size crickets each day. I offered her a medium sized grasshopper, and she just stared at it and did not strike at it. When it got too close she just

moved out of it's way. When I put the same grasshopper into the container that has the new green female I just found, she immediately grabbed it. The other mantis nymph I found on the storefront has one more moult to go and is eating very well.

August 27th - I finally have a room properly set up for mating. There is a tall branch with terrarium moss wrapped around it and a houseplant. I will put the mantids there and leave them there overnight with the door closed. First I choose one of the four female *Mantis religiosa*, and a male. I put the female on the branch, with the male a few centimetres below. I hand feed the female a cricket, and wait. At first the male does not notice her. Later he glances her way but appears to lose interest. I leave them alone and go out of the room. I check back every five minutes or so, and still no progress. She finishes her meal, and neither mantis is moving. I touch the male to get him closer, and try to get the female to walk a bit. The male begins to wave his antennas at the female, and she suddenly turns around and looks at him. Nothing happens for a few minutes. I leave the room and come back just in time to find the female with her wings raised in an angry posture directed at the male. He ignores this and keeps coming towards her. She grabs him suddenly and I react quickly and separate them before she has a chance to tear him apart. I allow them to calm down for ten minutes, away from each other. I notice her beginning to walk slowly up the branch. I put the male right behind her. He begins to sneak up on her and within a minute leaps onto her back, but finds himself facing the wrong way! He quickly realizes his mistake and turns around. Fortunately for him, the female does not react much, and they begin to mate. I immediately give her another cricket, which she takes from my hand. And hour later they are still together, so I close the door and go to the bedroom and go to sleep. The next morning I go into the room and hope for the best. The female is on the top of the branch, and a few metres away from her on the houseplant is the male, safe and all in one piece. I give each a cricket, and put them back into their cages.

August 28th - In the evening, I tried to mate another pair, (different male), but he never got the nerve to do it. He kept staring at her, and would only go toward her when she walked forward. If she took two steps, he did the same. If she stopped, so did he. At one point she started walking more quickly up the branch, and he kept following her at the same rate, until she stopped moving. He also stopped at that point. I decided to leave them in their room with the door closed overnight.

August 29th - In the morning when I go into the room, the male is still staring at the female, less than 30cm away, with no results. I put both back into their containers. The other two larger mantis species did not accept any food last night, but both took a cricket each this morning. I tried to give the female another one, but she dropped it after just a few nibbles. I wonder what is wrong with her? At this point I leave them alone and go to work. At lunchtime, I walk out the door and as I get to the end of the block on the corner of Main Street, there it is - underneath the metal window sill of a hair dresser shop - a large green female *Mantis religiosa*, the biggest one yet. I take her and put her in a bag. I put her in the car and go shopping. I go through the rear entrance of a pharmacy, and on the white painted brick wall about 30cm above the ground is another female *Mantis religiosa*, a dark brown one. Oh, well, I guess one more won't hurt, but I really need more males!

Sunday August 30th - I walk out of the house on this hot afternoon to go to the beach, just a short walk to the end of the next block. I glance across the street, and see an adult green female *Tenodera aridifolia sinensis* perched upside down on a black steel tube column that holds up the stair of the adjacent building. About 15m from there, in another garden I spot two nymphs of the same species. These are all on the sunny south side of the buildings. The following day, I see two more nymphs on evergreen shrubs in a different garden, one

block from my house. As far as the captives go, that night I make another attempt to mate one of the brown *Mantis religiosa*, this time with the same male I used before. It is a success, and the male survives. He does the same thing as he did with the previous female - he leaps onto her back facing the wrong way, then turns around after a few seconds. I wonder if this is intentional?

Mantis abstracts

The following are abstracts from papers published recently, or in some cases details of teh paper but without an abstract. The papers are in English unless otherwise indicated. The editor would be grateful for copies of any recently published papers so that abstracts may be included in this section of the newsletters.

Bakthavatsalam N. (1997) *Podagrion* sp. (Hymenoptera: Torymidae), an egg parasitoid of mantids in Nagaland. *Journal of Biological Control*, 9(2): 130.

The eggs of *Tenodera aridifolia sinensis* (Saussure) were parasitised by *Podagrion* sp. in Nagaland. The percentage of oothecae parasitised was 28 and 40.6 during 1987 and 1988, respectively.

Benrekaa, A. & Doumandji, S. (1997) Comparison of the diet of *Mantis religiosa* Linnaeus, 1758 and *Sphodromantis viridis* Forskal, 1775 in the suburbs of Algiers. *Entomologiste (Paris)*, 53(6): 253-256. [In French]

On laboratory, the analysis of excrement's content of *M. religiosa* and *S. viridis* on the periphery of Algiers, has revealed their remarkable insectivory. For *M. religiosa*, the part of insects corresponds to 93.2% of Hymenopterous. Sometimes *M. religiosa* consumes Arachnids (5.7%) and even a bird. Concerning *S. viridis*, it consummates, above all, insects (95.3%) with 60.7% of Hymenopterous with 41.5% of Formicidae, followed by Arachnids (4.2 %) and Myriapods (0.5%).

Buckett, J.S (1996) The mantid *Stagmomantis limbata* (Hahn) in California. *Pan-Pacific Entomologist*, 42: 57-58. [No abstact available at present].

Del Cerro, A.L. Cunado, N. & Santos, J.L. (1998)
Synaptonemal complex analysis of the X-1X-2Y trivalent in *Mantis religiosa* L. males: Inferences on the origin and maintenance of the sex-determining mechanism. *Chromosome Research*, **6**(1): 5-11.

Characterization of sex chromosomes in males of *Mantis religiosa* L. (2n = 24 + X-1X-2Y) was carried out by C-banding, silver staining and fluorescence in situ hybridization. They are meta- or submetacentric, their arms being designated as X-1L, X-1R, X-2R, X-2L, YL and YR. Meiotic behaviour of the sex trivalent was examined through the analysis of synaptonemal complexes (SCs), prometaphase I (metaphase I) and metaphase II nuclei. On the basis of the SC analysis, chromosomal length measurements at mitosis and prometaphase I and data from several orthopteran species, it is proposed that the breakpoints of the reciprocal translocation that originated this complex sex-determining

mechanism were close to the centromeres of the X and the largest autosome, and that the asynapsed X-1L and X-2R regions observed in the sex trivalent at pachytene represent the original X chromosome. The X centromere being probably that of the X-2 element because it lacks a partner in the SC pachytene trivalent. The relationship among synaptic pattern, chiasma localization and balanced segregation of the sex trivalent is also discussed.

Dusse, K. & Hurd, L.E. (1997) Food limitation reduces body length in mantid nymphs, *Tenodera sinensis* Saussure (Mantodea: Mantidae): Implications for fitness. *Proceedings of the Entomological Society of Washington*, **99**(3): 490-493.

Growth rate and body size have been linked to fitness in the mantid, *Tenodera sinensis* Saussure (Mantodea: Mantidae). We asked how early in the life cycle food level could affect these two parameters. Two laboratory cohorts were offered prey at either high or low density during first and second stadia. These nymphs exhibited significant differences in predation rate, growth rate, and body size, but not in gross growth efficiency. Well-fed nymphs achieved larger body size in a shorter time than poorly fed ones during both their first and second stadia. Because body size of adult females determines maximum fecundity, this response suggests that food level during the early life history of this species can directly affect fitness. Flexibility in body size and rate of development may play an important role in determining distribution and regional persistence of this species in temperate.

Kral, K. (1998). Side-to-side head movements to obtain motion depth cues: A short review of research on the praying mantis. *Behavioural Processes*, **43**: 71-77. [No abstact available at present].

Terra, P.S. (1996) Maternal care in *Photina amplipennis* Stål (Mantodea). *Revista Brasileira Entomologia*, **40**(1): 9-10. [In Portuguese]. [No abstact available at present].

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